

Respects to Dr. Littorn.

A
TREATISE
ON THE
EXTRACTION
OF THE
CATARACT.

BY
FREDERICK BISCHOFF, F.M.S.

OCULIST TO HIS MAJESTY
IN THE ELECTORATE OF HANOVER,
AND TO HER MAJESTY
IN ENGLAND.

b. Groenover Street.

LONDON:
PRINTED BY W. BULMER AND CO.
AND SOLD BY G. NICOL, PALL-MALL.

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TO
JOHN HEAVISIDE, Esq.

SURGEON EXTRAORDINARY TO HIS MAJESTY.

SIR,

THE friendship with which You have honoured me during my residence in London for these two years past, could not fail to impress me with the most lively sense of gratitude.

In the course of this time, You have done me the honour of being present at some operations which I have performed.

Your extensive knowledge, and professional abilities, are so gene-

rally known, that it is out of my
power to enlarge on Your merits.

I trust that You will accept the
dedication of the following sheets,
as a small token of the great esteem
with which I am,

SIR,

Your most obedient

humble Servant,

Grosvenor Street,

May, 1793.

FREDERICK BISCHOFF.

INTRODUCTION.

~~which is intended~~
~~has been, that the person afflicted by this~~
~~disorder, has been compelled to apply either~~
~~to some travelling Quack, who is seldom~~
It may not be unnecessary to state, in this brief Address, the tenor of the present Treatise, and the reasons which led to its publication.

It is not meant to contain either a systematical description of all the species of the Cataract, or an explanation of all the different methods of performing the Operation; the intention of the writer is simply to explain to the young Surgeon the Extraction of the Cataract, and that in a way so familiar and intelligible, as to induce him to adopt the Operation in his practice.

Professional men, it has been found, and even those of acknowledged abilities, have sometimes shrunk from this operation, on account of the peculiar difficulties with which it is attended. The consequence has been, that the person afflicted by this disease, has been compelled to apply either to some travelling Oculist, who is seldom much interested in the welfare of his patient, or else to some Empiric, by whom every case is undertaken, merely because his confidence is equal to his ignorance.

Another reason for this Publication is, that some of the particularities of the author's method, have already been made the topic of conversation ; but verbal communications of this nature, being always vague and liable to be mistaken, it was his opinion, that on a subject at once so delicate and so important, nothing should be left to uncertainty.

Many excellent works have been produced, and by celebrated names, on the Extraction of the Cataract; but of these, it is to be observed, that they contain, in general, little more than first principles, seldom entering into particular detail. They have all the merit of first discoveries; but those works are so imperfect, that they leave wholly to the judgment of the practitioner those minutiae which, though they at first sight, appear insignificant, yet are known to contribute essentially to the expedition and completion of the cure.

To supply this defect, is the particular intent, as has been stated, of the present Treatise.

To absolute novelty in all its parts, the author makes no pretension; nor indeed, in the present advanced state of the sciences, does he conceive it to be attainable. He rests his work, he trusts, on the sure

basis of *Utility*. He is therefore free to confess, that, perhaps, the smaller part of the work is made up of his own ideas. In the greater part, he has compared his own experience with the principles laid down by those celebrated writers to whom he has alluded.

It will depend on the reception of this Treatise, whether or not he shall lay before the Public his ideas on the more complicated Diseases of the Eye, with the modes of cure, most warranted by the success of his practice.

THE AUTHOR.

A TREATISE, &c.

THE DEFINITION OF A CATARACT.

AN opaque body, placed between the pupil and the vitreous humour, intercepting, and thereby debilitating or destroying Vision, forms the disease termed a Cataract.

The seat of the Cataract, strictly defined, is either in the crystalline humour itself, or in its capsule, or in the transparent mucous fluid which is between the crystalline lens and its capsule (*humor Morganius*). In opacities of either of these parts, it is called the *true Cataract*; and if all these three parts are affected at the same time, it is termed the *mixed Cataract*; but if the opacity is on the outside of the capsule, it is denominated a *false Cataract*. To adduce an instance of this last, it sometimes occurs that either pus, or some other viscid and cloudy matter, is found in the anterior

chamber, the thinner parts of which have been absorbed, whilst the thicker remain; or that a mucus of a brown colour, supposed to descend from the pigmentum choroideæ, is found in the pupil before the capsule, which constitutes this description of the disease. If after an operation of a Cataract, the capsule, or the tunica hyaloidea, or any mucous matter, should come behind the pupil opaque, this is termed a *secondary Cataract*. Each of these species of the Cataract is subdivided into several others: to explain these is not within my present intention; my purpose is to confine myself to one of the most common species of the *true Cataract*: I mean that disease which consists in an opacity of the crystalline lens only; and the operation for its cure is by no means difficult.

THE DIAGNOSIS OF THE TRUE CATARACT.

The indications of this disease may be divided into those which are observed

by the *Patient*, and those which occur to the *Practitioner* on inspection. It is the more necessary to attend to these signs, as the amaurosis has, in the beginning, symptoms not dissimilar to those of a Cataract, though the distinction manifests itself decisively in the progress of the disease.

Of the symptoms which occur to the *Observation of the Patient* in the case of a Cataract, are to be remarked, *first*, that the vision is gradually debilitated; small and remote objects appear, in the first instance, to be covered with a mist, or, as it were, enveloped in smoke. In the progress of the disorder this appearance increases, until by degrees it extends itself to the largest and nearest objects. From the first affection of the organ, this symptom is constant and invariable, though its progress is accelerated or retarded in different cases. In the last stage of its advancement, the patient is unable to distinguish any objects, and there remains nothing more than a glare of light.

Secondly, The patient, in the commencement and progress of the disease, can see better by twilight than by daylight. The same occurs if the ingress of light be moderated by the intervention of the hand, or a screen. The reason of this is, that as the place is darkened, the pupil is enlarged; and the result is the same as if the opaque body behind the pupil was in the same degree diminished.

Thirdly, They can see lateral objects much better than those which are diametrically opposite them, because the rays of light which enter laterally, find the outer part of the crystalline lens less obscured than its centre.

Fourthly, Some aid is frequently obtained in the commencement of this disease from the use of convex glasses. This may appear, until the cause be assigned, to contradict some of the preceding remarks: it is, that objects seen through a convex glass are represented under a larger angle.

Fifthly, The power of distinguishing light from darkness most generally remains in the last stage of the disease ; and looking at the sun, or a clear fire, occasions a bright glare on the eye of the patient.

OBSERVATION OF THE OPERATOR.

The operator must examine the diseased eye both by daylight, and in a darkened room, by candle-light, and in all directions. If only one eye is affected, and the operator wishes to observe the motion of the pupil, the eye which is not affected must always be kept closely covered ; as without this precaution the operator may often be greatly mistaken : for the pupil of the sound eye being exposed to the light, communicates its motion to the pupil of the other, and they have commonly one motion ; which the surgeon will find, on close examination of the eye affected.

1. In the middle part of the pupil, he will observe an opacity, or a cloud, which

is not natural, it sometimes appearing of a white, grey, yellow, green, blue, or black colour, but differing from the natural black of the pupil: this colour in the beginning of the disease is scarcely visible; but as the visual faculty diminishes, the colour becomes more apparent, and diffuses itself more and more over the whole pupil, forming those little specks or clouds behind the pupil. It continues to extend itself in the progress of this disease, and the diminution of the sight is always in exact proportion to this extension.

2. If you examine the eye laterally, you will observe a black circle around the opacity, which in the beginning is large, but in the increase of the disorder it appears occasionally larger and smaller, in proportion to the dilatation or contraction of the pupil.

3. The iris always preserves its natural colour, and has at times more and less motion.

THE OPERATION FOR THE CATARACT.

It is very seldom possible to cure the true Cataract with medicine only; and those few cases where the Cataract has been said to be cured without operation, by internal and external medicine alone, are not sufficiently proved: it is matter of great doubt whether the practitioner has not, in these cases, mistaken an opacity in the transparent cornea, or before the pupil, for a true Cataract. In the former cases, some relief may possibly be given by medicine, internally and externally administered; but in a true Cataract, where the crystalline lens is not only opaque, but its whole organization destroyed, it is plain that no effectual relief can be obtained but by resorting to an operation.

Of what the medicines consist, which are tried in those cases, it is not my purpose to state; I confine myself solely to the only efficacious remedy, the operation.

The operation is practicable in two different methods, viz. *Depression* and *Extraction*. In the first mode of practice, the oculist depresses the opaque crystalline lens from its natural situation to the bottom of the eye, where being no more behind the pupil, it cannot intercept or prevent the rays of light from passing to the retina: in the second mode, the oculist extracts the opaque crystalline lens, by making an incision into the transparent cornea, and removing the opaque crystalline lens entirely out of the eye. The first operation has been long known, and is called *Depression*, or *Couching*; the second operation is more novel, and is called *Extraction*. Both these modes of operating have their respective preference; but it is generally to be observed, that the cases where extraction is preferable, are much more frequent than those which are to be cured by depression.

The season of the year for the performing this operation is not material; it is only necessary that the patient be in a moderate

degree of warmth, and that at all seasons can be effected. Should any epidemic disorder prevail, the time must be considered as unsuited to this, as to all other great operations. Violent heat in summer is at all times fatiguing, and under some circumstances dangerous to the patient ; and should on that account be avoided.

The operator may with reason hope for success, 1. When the patient, independent of the Cataract, is in perfect health. 2. When the proximate or occasional cause no longer exists, I mean that acrimony, arthritic or venereal, &c. which might have produced the opacity. 3. When the patient, after the beginning of the Cataract, is not affected with frequent head-achs, and inflammations of the eyes. 4. When the patient can clearly distinguish light from darkness. 5. When the pupil moves free and lively, and retains its natural roundness. 6. When the eye has a spacious anterior chamber. 7. When the Cataract is at a certain distance behind the pupil ; and,

8. When the other parts of the eye are perfectly well, and free from blemish.

But even though there should be a concurrence of all these favourable circumstances, yet the operator must be very cautious, and indeed can never with propriety insure the success of the operation; for even if attended by the most favourable symptoms, it may sometimes fail, and yet the operator be blameless.

PREPARATION OF THE PATIENT.

A patient intending to submit to the operation must be prepared: and here the golden medium should be observed, to which too many operators neglect to attend. Long experience has proved, that excessive or tedious preparation is not only useless to a person who is to undergo the operation for the Cataract, but it is often injurious.

The preparation is *special*, or *general*. *Special*, if a patient afflicted with a Cata-

ract labours at the same time under other diseases, which may have an influence on the operation. These diseases must be first removed, or the operation will be attended with more hazard. Such dangerous influence may be caused, for example, from sordes biliosæ, plethora, congestion from the blood to the head, &c. &c. The *general* preparation is that which is recommended to every patient afflicted with the Cataract, and who is in a good state of health.—Every heat of the body, and agitation of the mind, is injurious.—All strong food and spices, &c. must, for some days preceding the operation, be avoided; also every thing that causes general heat and obstruction should be disused. To clear the *primæ viæ*, he must take, a few days before the operation, an opening medicine. One great point, as well in this as in other operations, is to keep the *primæ viæ* clear. Plethora through bleeding, and cooling attenuating remedies; congestions from the blood to the head, must be removed by using lukewarm

pediluvia, &c. &c. But this regards the special preparation; and every intelligent surgeon must, without my advice, understand how such complaints are to be removed.

In general, the preparation must be as short and simple as the constitution of the patient will permit. The longer the preparation, and the more formality that is used, the longer the patient is kept in fear and anxiety: this disturbs the secretions and occasions weakness in the nervous system, and sharpness in the juices. The principal circumstances to be observed in this operation are, that the patient is in good spirits, free from vexation and anxiety, and, if possible, from any fear of the operation. For these reasons, I should therefore never defer the time when once fixed, avoid letting the patient be acquainted with the hour intended, and take him by surprise. I have before said, that it is impossible to insure success; but the operator should always give the greatest hope, and take all possible pre-

caution to divert the thoughts from the operation. He should conceal every thing that may offend the sound eye of the patient; he should avoid a consequential bustle of preparation, and be careful not to exhibit his instruments, be they ever so magnificent, as these always produce apprehension and terror in the patient: he should not, for the purpose of increasing his own merit, make the operation appear more difficult and hazardous than it really is. This practice may suit the Charlatan, but every skilful surgeon must be well convinced it is equally ridiculous and despicable.

OF THE SURGEON'S PREPARATION.

Care and caution are requisite on the part of the surgeon in all operations, but he should attend more particularly to this; for though it does not affect the life, there depends on it one of the most valuable senses, the *sight*.

He should, at least, have every thing in

readiness which is necessary for the operation some days before; and lest any thing should be wanting at the appointed time, it will be proper to examine his apparatus a few hours preceding the operation. The delay occasioned by waiting for any thing at that time is awkward, and disagreeable both to the surgeon and patient, and may perhaps be injurious.

The main point is, that the surgeon should know well how to place himself, that nothing may embarrass him, and that he may be free from all involuntary motion; he should likewise be careful to keep all the actions of his patient in his power.

You cannot sufficiently admonish the patient to refrain from every sudden motion of the head and eyes; which always impedes, and frequently defeats the whole of the operation: therefore this operation is seldom practicable on children with success, because this advice is useless.

Most surgeons, to fix the head of the patient, press it against the breast of an

assistant; but it is obvious that the least motion, even the assistant drawing breath, occasions a corresponding motion of the head of the patient. It is impossible that a man should be as immoveable as a machine; that the operator may have the head of the patient fast, and wholly in his power, I propose, therefore, a chair, which I have for many years found to be useful (See Tab. I. Fig. 1.). It is a strong-made chair, to which is fastened a back, *a*, which on each side, by means of a screw, *b*, moves backwards and forwards. In the top, *d*, which can by *c*, if necessary, be turned back, is a little concave cloth cushion, for the greater security of the head, and to prevent slipping. As I always perform the operation standing, the chair is made convenient for my size; and, to make the patient a proper height, I have different pieces of wood (Tab. II. Fig. 1. *e e*) to put under the cushion. Each of these pieces of wood has two pegs, *ff*, which fit in the holes of the seat. The cushion, (Tab. II. Fig. 2. *b*),

is made in a wooden frame, to which is fixed (Tab. II. Fig. 2.) two pieces of iron, *ii*, which go through the holes *ff* in the chair, and fasten at the back, in the hind part of the chair, with an iron peg (Tab. I. Fig. 3. *gg*). There is nothing to be observed more than two bars (Fig. 3. *bb*) to support the top; *i* is a stand, to prevent its falling, received into the notches *k*; which enable the operator, by their different distances, to incline the moveable top as much backwards as he thinks suited to the most favourable position of the head, during the operation.

Let the patient be seated a few days before the operation upon this chair, and bring the seat to the proper height, that the head may exactly rest within the concave cushion, that on the day of the operation he may not have any secondary things to claim his attention.

In the like manner have ready all the instruments and bandages. The bandage which I use for this operation is (Tab. II. Fig. 3.) a double piece of linen, *aa*, about three

fingers broad, and proportioned in its length to the circumference of the head. At each end of this bandage are to be fixed two strings, *b, b*, to tie it upon the forehead. To this piece are sewed two pieces of double, dark coloured silk, or linen, *c, c*, about six fingers square, so that the piece which covers the diseased eye should be a little under the other piece, that no light may possibly reach the eye on which the operation has been performed. These two pieces must not reach below the nose. This bandage, two thin pledgets, for using after the operation, some lint, to cover the sound eye during the operation, a thin silk handkerchief to tie up the sound eye, and a linen one to dry the tears, are all that is necessary on this occasion.

Some inconveniences result during this operation, from the necessity of keeping up the upper eyelid with the finger alone, as it easily slips down, and the tears which flow incessantly, make it so slippery that

it is impossible to retain it with the finger, without either drying it continually, or making a dangerous pressure upon the eye.

Much advantage must arise, therefore, from keeping up the eyelid without causing any irritation, or pressure on the eye; and to obtain this end, I use the Elevator, (vide Tab. III. Fig. 1.) which is of silver wire; about two lines thick; it has on the upper part, by *a*, a ring, by which the assistant keeps it, from *b* to *b*; it should be well nealed, that by this means becoming softer, it may be more easily adapted to the form of the orbit of the upper eyelid, and fit well, without pinching.

The knife, which I use for this operation, (Tab. III. Fig. 3) is the same as that improved by the celebrated Professor Richter, in Gottingen, and which I have found, certainly, to be the best for this operation; I shall therefore in the description use this great oculist's own words.

“ The knife which I use is different

“ from every other knife intended for the
 “ same purpose. Simple as it may appear,
 “ there are still a great many things to be
 “ remarked concerning it. It may, per-
 “ haps, be supposed, that more depends on
 “ the hand that guides the knife, than on
 “ the knife itself ; and there is some truth
 “ in this ; but we shall soon be convinced,
 “ that the ease and nicety with which the
 “ operation is executed, depends very much
 “ indeed on the structure and make of the
 “ knife, and who would not rather use a
 “ convenient knife than such a one as is ma-
 “ naged with difficulty and inconvenience ?
 “ One of the great requisites in this opera-
 “ tion is, not to allow the aqueous humour
 “ to flow out until the incision be ended :
 “ therefore the blade of the knife must be
 “ constructed in such a manner, that it
 “ gradually increases in breadth from the
 “ point to the heel, in order both to en-
 “ large the wound as it passes along, and
 “ also to fill up the incision as it is made,
 “ and thus prevent the discharge of the
 “ aqueous humour. Both Mr. Beranger’s

“ knife and mine are of this shape, and all
 “ others not so constructed are worth no-
 “ thing. The whole depends upon this,
 “ that the knife with which we are to cut
 “ the cornea should, at its broadest part, be
 “ fully as broad as half the diameter of the
 “ cornea. The cornea is in general about
 “ six lines in diameter ; the knife, there-
 “ fore, must be three lines in breadth, and
 “ at least ten lines distant from the point ;
 “ taking it for granted, however, that no
 “ more than the under half of the cornea
 “ is intended to be cut through. In using
 “ a knife, such as I have described, we shall
 “ find, that as soon as it has traversed the
 “ anterior chamber, and that that part of
 “ its blade which is three lines in breadth
 “ enters the eye, then the inferior portion
 “ of the cornea will be divided. It is un-
 “ necessary to draw the instrument back.
 “ the whole is done with one cut, and the
 “ aqueous humour does not flow out be-
 “ fore that is finished.*

* In the case of a prominent eye, this knife of Professor

“ The blade of my knife is about an inch
 “ and an half in length. It is convex on
 “ both sides : whilst the knife traverses the
 “ anterior chamber of the eye, the con-
 “ vexity of its side presses the iris back,
 “ and keeps it from falling under the edge.
 “ A convex blade also is easier pushed
 “ through the cornea than a flat one, and
 “ it does not rub so much on the iris.

“ The point of the knife must be sharp
 “ on both edges, for the least the breadth
 “ of one line, in order that it may enter
 “ quickly, and easily.

“ Particular care ought to be taken that
 “ the point of the knife is well conditioned.
 “ I have seen it happen that the point of

Richter is very useful; but I think not in those where the
 eye lies deep; there will certainly be danger in the latter in-
 stance, that this projecting point may lacerate some part of
 the internal angle of the eye, and thereby produce a sudden
 motion of that organ, so as to disturb the whole operation;
 therefore have some broader knives in readiness, of which
 the blade should increase in breadth so rapidly, that the
 broadest part of it be only seven or eight lines from the
 point.

“ the knife has bent on the cornea.* If
 “ such a knife be not very sharp, it does
 “ not enter, and, upon the surgeon making
 “ use of more force, it suddenly pierces
 “ the cornea, and lacerates the iris. The
 “ great error consists in making the point
 “ too thin, and too flexible ; in a word, too
 “ much like the point of a lancet. A knife,
 “ whose point is so constructed, subjects
 “ the operator almost to a certainty of la-
 “ cerating the iris. It is true, that with a
 “ little dexterity, especially if the point be

* I saw, in the year 1783, from the famous oculist the
 brother P—ll—r, a worse accident, viz. the point of the
 knife was too rigid, and, in the coming out at the internal
 angle of the cornea, the point broke off, more than one line;
 they would not wait till I could send for a magnet, but
 opened the wound in the cornea, larger and through an in-
 apt manner, the lens with capsule, and a part of the vitre-
 ous humour, suddenly came out, the broken piece of the
 knife fell into the posterior chamber. A violent inflam-
 mation, and a purulent eye was the consequence; the
 other eye, on which the operation has been performed with
 the best success, was, in consequence of the accident to the
 last, affected with the same inflammation; and the poor wo-
 man, after having suffered much, was entirely blind with
 both eyes.

“very sharp, the knife may be made to
 “enter the anterior chamber of the eye
 “with apparent ease; but as soon as it
 “comes in contact with the opposite and
 “internal surface of the cornea, owing to
 “the density of that membrane, and the
 “obliquity of its direction, the thin flexible
 “point is reflected posteriorly, and una-
 “voidably lacerates the iris before it can
 “be pushed through the other side. Par-
 “ticular direction ought, therefore, to be
 “given to the instrument-maker to have
 “the point made pretty strong, and firm,
 “although not rigid, nor inelastic.

“The back of the knife must be made
 “quite blunt. As we push the knife for-
 “ward, its back ought to be turned a little
 “toward the iris; this would be impossible
 “were it sharp, from the risk we should run
 “of wounding that part. It is evident that
 “a knife with a sharp back, such as *Poyet's*,
 “&c. must cut the cornea both upwards
 “and downwards, which is quite con-
 “trary to the intention of the surgeon,

“ who only wishes to cut the inferior half
 “ of that membrane; for which reason the
 “ knife ought to cut only downwards.

“ The back of the knife must not, there-
 “ fore, be sharp, nor must it be too thick;
 “ the thinner the better; for when it is
 “ thick, it dilates the upper angle of the
 “ wound too much, and causes a small
 “ opening at the top, through which the
 “ aqueous humour may flow out. The back
 “ of my knife is thin, and therefore has not
 “ that inconvenience. I must here take no-
 “ tice, that the person who sharpens the in-
 “ strument, very often, through inatten-
 “ tion, sharpens it on the back, especially
 “ near the point. This neglect, if not disco-
 “ vered, may be attended with bad conse-
 “ quence. For my part, before I make use
 “ of a new sharpened knife, I always pass
 “ the back of it over a fine stone.

“ The back of the knife must be perfect-
 “ ly straight, not bent nor curved. A knife
 “ perfectly straight on the back, which is
 “ made to enter the anterior chamber of

“ the eye, at the external point of the
 “ transverse diameter of the cornea, will
 “ easily follow that direction, and come
 “ out exactly at the opposite point ; but
 “ on the contrary, if a knife be made use
 “ of with the back curved, or bent, it must
 “ happen that the point, although entered
 “ exactly opposite the centre of the cornea,
 “ will come out much lower at the opposite
 “ side ; and indeed always the lower the
 “ more bent it is. It is true, this fault may
 “ be corrected, by elevating the point of
 “ the knife in the chamber of the aqueous
 “ humour, as soon as it approaches the in-
 “ side of the eye, and then pushing it
 “ through the cornea. But that is a parti-
 “ cular manœuvre, that requires much at-
 “ tention, and renders the operation at
 “ least more difficult, for, the fewer steps
 “ there are in any operation, the easier will
 “ that operation be.”

So far Professor Richter.

(Tab. III. Fig. 4.) is a straight knife, the

blade about an inch and an half long, and two lines in breadth ; on the point is a little button.

(Tab. III. Fig. 5.) is the needle for opening the capsule.

(Tab. III. Fig. 6.) is a hook which I use for extracting the obscured capsule, &c.

(Tab. III. Fig. 2.) is the Parma spear, corrected by Casaamata, to make an unsteady eye firm ; this spear is two inches in length, with a handle as long again ; the needle is bent like an S ; a half line behind the sharp point is a large blunt button, to prevent the point going too deep in the cornea.

(Tab. III. Fig. 7) is a little broad hook, for keeping down the under eyelid, while using the spear (Fig. 2) ; by *a*, it is hooked in the under eyelid, and by *b* a little weight, or a key is suspended.

It is a frequent complaint of the surgeons in this operation, that the knife for cutting the cornea is never sufficiently

sharp. This complaint is often very just, therefore it would be better if the surgeon were to endeavour himself to sharpen his instruments, than that he should be obliged to rely on the word of the instrument-maker. Sometimes this complaint is unjust, as bluntness will often seem to exist, but is in reality produced by resistance from the hardness and thickness of the cornea ; and as often from the fearful and unsteady hand of the operator.

All the instruments that are necessary for this operation must, as I have before said, be ready at least a day before the operation ; and the chair brought to such a height, that the patient's head may rest exactly within the concave cushion. The elevator, (Tab. III. Fig. 1) properly bent, and every thing in due readiness.

From the room, in which the operation is to be performed, all false light must be excluded ; and, for that purpose, every window, except the one which gives the best light for the operation, must be effectually

closed. Not only a double, but a too strong light is dangerous; therefore, at the same time be careful to regulate the unclosed window in such a manner, that at any moment during the operation you may have as much more or less light, as may be necessary for your purpose.

The patient's bed must be adjacent, or, if possible, in the same room in which the operation is performed; every motion after the operation, is not only troublesome, but dangerous to the patient. The sleeping room must be made dark, and carefully preserved from any possible entrance of strong light.

Let the patient be released from all superfluous cloathing, and let him be in a night-gown, or great-coat, that he may not be, after the operation, long occupied, or in useless motion by undressing.

If the patient is remarkably timid, it may be as well that he should not know when you propose to perform the operation, for which purpose you may therefore

give him frequent visits at unappointed times. If he should absolutely desire to be acquainted with the fixed hour for the operation, rather tell him a day later, than that actually fixed for the purpose, that if any unforeseen impediment should make it necessary to postpone the operation, the surgeon may still keep his word with the patient.

One cannot too scrupulously adhere to a promise made to those who count, with passionate expectation, each minute, looking forward to that happy one, when they hope to receive their sight. Every disappointment should likewise be avoided, on another account, as it tends to disturb the serenity of the patient, and by ruffling his spirits, to render him less fit to undergo so important an operation.

The surgeon, to return to necessary minutiae, should take every care to have a strong chair for himself, in case he should sit during the operation. He should likewise choose as clear a day and sky as possible.

The light of the sun is injurious, and a sky which is one moment bright, and the next clouded, is apt to derange the operator.

If the patient has not had an evacuation on the day of the operation, let him have an emollient opening clyster a few hours before; and if he should be very fearful of the operation, give him, an hour preceding, one grain of opium with some wine, which will be found of service.

When every thing is thus prepared, I now come to the operation itself. But here let me remark, that in *my judgment*, it should be performed on one eye only at a time, in case the patient should be blind of both. The contrary practice can only have originated in the precipitance of some itinerant oculist, who, not having patience to wait for the recovery of the first eye, undertake *the double operation*, for the sake of *the double fee*. He then departs, and frequently leaves the patient in a state of incurable blindness! To shew the hazard, and to demonstrate the inhumanity of this

practice, it is only necessary to observe, that the operation for a cataract may be performed on one eye, with the best success, yet, through some unexpected circumstance, fail with respect to the other. The immediate communication between the eyes is well understood. The strong inflammation of the eye, on which the operation has miscarried, affects the other in its weakened state, and by this means both are frequently lost. A variety of such cases have come within my knowledge, in the course of my practice, and all arising from that indecent precipitation which I have stated. If the patient can see, after the operation of one eye, then he does not require to undergo a second on the other ; but on the contrary, if it should so happen that the first miscarries, there is a remaining hope of success from the second. This hope, as I have observed, is totally extinguished by a double operation.

Here a question occurs, which I think this the proper place to discuss; namely,

Whether *the Assistant* should be a surgeon, or a man acquainted with this operation, or not? My opinion is, he should not. It is supposed that an informed man can assist the operator; but he wants no other aid, than the simple act of keeping up the eyelid. The assistant need not, therefore, be acquainted with the operation; on the contrary, I maintain that an assistant, who thinks himself possessed of knowledge, is of much more injury than use. His curiosity and earnestness to see the operation, as he stands behind the patient, causes him to bow his head over, and to forget to take care of the eyelid, or he makes a dangerous pressure on the eye. His confidence may even go far enough (if he keep up the eyelid with the finger) to think that he may aid the operator by a push, or a pressure, in the operation, which is enough to defeat the whole. I have seen many instances of this; it is therefore clear, that an assistant having any knowledge of the business, instead

of advantage, occasions inconvenience and danger. I therefore should recommend for an assistant an intelligent man, who is unacquainted with the operation, and attentive only to the instructions of the operator.

The assistant should have been previously instructed to watch the eyes of the surgeon, who must let him know by their means to lift the eyelid, or the contrary. It is proper to accustom every assistant to understand by signs from the operator what he has occasion for; as a blind person is ever attentive to hear what passes, and the calling for instruments, knives, scissors, &c. make fearful impressions on the patient. The surgeon should rather, during the operation, converse with him on indifferent subjects, and endeavour to turn his thoughts from what is doing.

THE OPERATION.

First, take from the patient his neck-cloth, unbutton his shirt collar, and release him from every thing which may hinder the free circulation; then seat him in the chair, that is already adapted to the height required; let him put his hands across his back, or secure them in such a manner, by a strong inflexible cane placed between his arms and back, as to be certain that, during the operation, he cannot direct them to his eyes, or the instruments of the operator. If this situation should incommode a lusty person, you must direct the assistants to give strict attention to his hands. The operator must either stand, or sit on a strong chair; but in such a position, that his mouth may be exactly on a level with the eyes of the patient; the feet of the latter must be stretched out betwixt those of the operator. The surgeon must, in this situation, be near to a window, that

he may have a clear light ; the patient must sit so that the light may fall sideways over the nose to the affected eye ; for if the patient sits opposite the light, the surgeon himself being in the shadow, this interposition hinders him observing if the pupil be clear ; on the contrary, if the light comes from the side of that eye on which the operation is to be performed, the shadow of the hand, or the knife, is always an obstruction. Some pretend that the eye always turns towards the light ; this is not quite certain, in the case of a patient afflicted with the Cataract. It is more clear that the blade of the knife, or the hand, always make a shadow, and that the eye is otherwise too much exposed to the light ; but in this particular, every surgeon may do as he thinks best.

Let the assistant be now placed behind the patient's chair ; the latter being seated as before directed, in such a manner that the light falls sideways over the nose upon the eye affected ; take then some doubled

lint, and put it on the eye which is not to be operated, and tie it fast with a thin silk handkerchief, which is preferable, because it takes but little room; lest the sound eye should come into motion, and by its communicating with the other, render the operation more difficult. It is necessary to have some wine ready, to refresh the patient during the operation, and some cold and warm water. The surgeon should select all the necessary instruments, and place them on a napkin, in a dish, in the probable order he may want them, and let an assistant hold this near to him, that he may readily take those for which he has occasion.

During the time that the cornea is divided, much light must fall on the eye, for through that, the pupil contracts itself, and the iris will not so easily press under the edge of the knife, and at the same time you have less to fear from the sudden protrusion of the crystalline lens, after the incision is finished.

With the elevator (Tab. III. Fig. 1.) the upper eyelid must be kept up; give this into the hand of the assistant, who is behind the patient's chair, (but never let the assistant put it on.) If it is the left eye, (which I now propose for the operation) the assistant must keep his right hand under the chin of the patient, and support it in such a manner, that his face may be a little turned upwards, and at the same time let the head be gently pressed against the back of the chair; the assistant keeps the elevator with the left hand, by *a*, pressing it gently upwards against the edge of the orbit.

Many oculists, during the operation, keep the hand (with which they make the incision in the cornea) firm on the cheek of the patient; some put their elbow on their knee, and rest their foot on a stool; others lay their elbow on a table, &c. &c. to make their hand more firm: but all these positions seem to me to be too confined, and to hinder that freedom of motion

which is necessary to an operator. My method is, to press the upper part of the arm and elbow of that hand, with which I perform the operation, strongly against my own breast and ribs, and lean my little finger about an inch, from the outside of the eye, on the cheek-bone of the patient, and, as soon as I see the eye in a good position, I at once hold my breath, and remain in that situation while I make the incision in the cornea, which assists greatly the firmness of the hand. Though this may appear trifling, it will be found of great utility.

To command the patient, in harsh words, to keep his eye steady, is absurd ; it only tends to excite apprehension, as the motion of the eye is not in his power ; any harshness can only add to his fear, and thereby render the eye more unsteady, therefore, leave him to himself, give him a small quantity of wine, and you will find that the patient will be quiet, and in a few minutes the eye quite steady.

The surgeon, in this operation on the left eye, must press with the first and middle finger of his left hand, the under eyelid down, and if the eye is a little unsteady, he must make the pressure rather stronger with the middle finger, which hinders it retreating into the inner corner.

The knife he must take in his fingers, like a pen, and lean the little finger of his right hand on the cheek-bone of the patient; and he should give great attention to the motion, when the eye is directly straight forward, but looking a little up, and outwards. As soon as the eye is in that direction, introduce the knife a little over the horizontal diameter, and a half line from the albuginea, in the cornea. But do not insert the knife in the cornea, if the eye be not in the position just now stated. The impatience of the surgeon sometimes so far misleads him, that although the eye is not in the right direction, by introducing his knife into it, he hopes to bring it right; but, in this case, he is greatly mistaken. It

will be found infinitely better to wait the favourable moment. The coolest patience is necessary, as well as the strongest presence of mind, in an operation on which depends the greatest happiness of life—the sight.

The incision in the cornea, must be shaped like an half circle, and must begin in the outer corner of the eye, a little over the horizontal diameter (as I have stated) in the transparent cornea, and come out in the same direction in the inner corner of the eye, that the under half of the cornea may be cut; and this incision must be the distance of half a line from the albuginea.

In this part of the operation, much depends on the incision being sufficiently large; and it is always better, that it should be a little too large, than too small. The only way of making the incision sufficiently large, is, by keeping the knife, in passing through the oblique diameter, as near as possible to the outer edge of the cornea. The farther the entering of the knife

is from the outer edge of the cornea, the less will be the incision. The larger the incision is, the more easily and gently the crystalline lens is extracted through the pupil. It is not my intention to advise the incision to be two-thirds of the circle of the cornea ; there may be an apprehension, in this case, of a sudden protrusion of the crystalline lens, and also of the vitreous humour, and iris.

Particular care should be taken by the operator that he performs this incision well, that the aqueous humour does not run out before the whole incision be finished. If the aqueous humour flows out sooner, the anterior chamber collapses while the knife is still in it ; the iris becomes then close to the cornea, and comes before the point, and under the edge of the knife. In this case, it is impossible to bring the knife through the anterior chamber to the inner corner of the eye, without hurting or wounding the iris ; and to continue the

incision in the collapsed cornea with the same knife, would make the wound too high, and uneven, and by this means the whole operation often miscarries. Of this I shall speak hereafter. But take all possible precautions, to finish the operation with proper quickness, by making the whole incision with an even movement in the cornea *at once*, before the aqueous humour escapes.

As soon as the eye is in the direction that is desired, you must make, with that finger with which you keep down the under eyelid, a soft easy pressure on the eye, as I have before said ; put in the point of the knife a little right angular, (then, if you put it a little awry, you will soon come betwixt the lamellæ of the cornea) and push through the cornea.

Now the knife is through the cornea, in the anterior chamber, change the direction, so that the point be directed to the spot at the inner corner, where it

must come out ; keep the knife quite parallel with the iris, but with the edge a little outward from it, and push it with an even movement to the inner corner, and finish the incision as I directed before.

If the eye is prominent, the anterior chamber large, the patient not very timid, the eye quiet, and the operator has firmness enough in his hand, sufficient presence of mind, and be not precipitate, this part of the operation may always be performed with a sufficient share of certainty.

But, in spite of every previous rule, and every possible precaution, it will sometimes happen, through unforeseen circumstances, or mistake of the operator, that the incision is not properly finished ; this is occasioned either by the motion of the eye on the internal angle, or the aqueous humour escaping too soon, or the iris falling before the point, or under the edge of the knife, &c.

If the surgeon, as soon as he observes that the eye begins to turn to the inner

canthus, cannot prevent it, by a soft pressure with the finger, on the under and inner side, he will do best to press the knife directly downwards, and divide through as much of the cornea as possible ; and if it should be only a half of the incision he intended, he can afterwards finish it with a pair of scissors. (To draw the eye forward in this case with the knife that is in it, and to finish the incision, requires all the dexterity of an experienced and cool hand, and even then seldom succeeds.) It is said, only through prejudice, that the opening by a pair of scissors makes a wound which is apt to suppurate, and frequently leaves behind an opaque cicatrix. Repeated experience proves, that an opening in the cornea with a good sharp pair of scissors, will heal as even, and as well, as if done with a knife. Those which are used for this purpose are different. I make use of a pair like those of *Daviel*, with blunted points. The method of using these scissors is quite simple. I lay (in an

operation of the left eye) my fore finger of my left hand fast on the cheek of the patient, to keep down the eyelid. I then place my scissors on the back of the finger, as a firm point, and make the incision in the cornea sufficiently large.

The cases in which the iris generally falls before the point, and under the edge of the knife, are when it is inserted too near the outer edge of the cornea, (too near the albuginea) when the aqueous humour flows out too soon, when the assistant makes a pressure upon the eye, or through any other cause occasions a spasm, from irritation on the muscles of the eye, by which the iris is pressed forwards. If, with every precaution observed, the iris should fall before the point of the knife, you must try, by a soft pressure and rubbing upon the cornea, to make the iris retreat, and move the point of the knife a little to the cornea, and over the iris. If the iris falls forward, and the knife is in the inner canthus, and through the cornea, try likewise

through a soft rubbing upon the cornea, and by keeping your knife still, to make the iris recede, and to finish the incision.

If, notwithstanding all these endeavours, the iris will not recede, be not precipitate; turn not the edge of the knife more towards the cornea, to finish the incision: it never can in this manner be made as it should be, and you endanger the patient; for the cicatrix will, after the operation, appear too high, and on its size and situation depends the sight. The best mode, under these circumstances, is to withdraw the knife, and to finish the opening with a pair of scissors, or with a knife with a blunted point, as will be mentioned in the sequel.

Sometimes before the operation, the eye is in such an unquiet and convulsive state, that all the repose and intervals that are given cannot make it quiet. If the surgeon, retaining his presence of mind, has lost all hopes of fixing the eye, and is convinced that there remains nothing else but to se-

cure it with an instrument ; I believe that out of all the number of instruments recommended for this purpose, the spear of Parma, corrected by Casaamata (Tab. III. Fig. 2.) is one of the best. The inconvenience of this instrument is, that it requires the whole hand of the surgeon, and will not admit a finger to be left for keeping down the under eyelid ; but this fault is to be remedied by affixing the little hook (Tab. III. Fig. 7.) to the under eyelid by *a*, and by *b* hang a small key, heavy enough to keep it down : by this is spared a hand extraordinary ; but be sure to avoid, as much as possible, all superfluous instruments.

In the operation of the left eye, you take the spear (Tab. III. Fig. 2.) by *a* in the left hand, put up by *b* the fore finger, and watch when the eye is in the direction before mentioned, and push at once the point of the spear horizontally about a half line over the oblique diameter of the cornea, and half a line from the albuginea, in

the inner part of the cornea ; in this manner you can, by a soft pressure with the spear, keep the eye, without harm, immoveably fixed ; when you find that this is effected, push the knife, at the same moment, into the opposite side, (Tab. IV. Fig. 1.) as I before intimated, and complete the incision. But if you make use of the elevator (Tab. III. Fig. 1.) to sustain the upper eyelid, then make a soft pressure with the finger with which you keep down the under eyelid ; and take care that the point of the knife be well sharpened, and choose one which has not too thick a blade. You will be very seldom incommoded through the strong motion of the eye ; and it is not often that the use of the spear will be necessary.

The method thus described, of cutting the cornea at once, and with one knife, can always be used when the eye is quiet ; but every experienced oculist knows, that though before the operation, the patient and the eye are quiet, he cannot rely on

the same degree of quiet during the operation.

The slight irritation which arises from keeping up the upper eyelid, and the beginning of the operation in piercing the cornea, though void of feeling, particularly with sensitive and irritable patients, often occasion a sudden spasm in the muscles of the eye, though the cornea be cut at once, and in the best manner; yet if the eye be prominent, with a large moveable pupil, the crystalline lens, with or without its capsule, may suddenly gush out, and frequently with it a part of the vitreous humour. This case often happens, and sometimes without detriment to the patient; but there too frequently arises from this an irregularity, a prolapsus, and paralysis of the iris, and concretion of the pupil (*synizesis*), by which the whole operation is frustrated.

This is sufficiently proved by a great variety of cases, where the best skill, of the most experienced oculist, was of no avail.

In such a delicate operation as that which has for its object, to restore the sight,

nothing dare ultimately be hazarded. It remains, therefore, only to state the safest and most efficacious mode of proceeding, in case of the accident happening which I have just stated.

I am not, for my own part, of the number of oculists who pride themselves on the mechanical adroitness of performing this operation. The credit of quickness must not be attained by the operator at the price of the patient's safety.

Some oculists advise in the case of a spasm, when the knife is in the eye, or the point through the anterior chamber, and such convulsion should occur, to keep the knife for a moment steady, and to finish the incision slowly. I have tried, at different times, this manner, but always found that the crystalline lens sprung forwards suddenly, and frustrated every precaution.

Experience proves the success of the operation to be the better, the more slowly the crystalline lens comes forwards, because the pupil is the more gradually di-

lated; but on the contrary, the quick coming forward of the crystalline lens, by its distending too suddenly, tends to lacerate, and to destroy the figure of the pupil afterwards. In the latter case, the pupil loses its motion, and changes its figure, and the consequence is a proportional diminution of the sight, (vide Tab. IV. Fig. 4.). When I observe, therefore, in this operation, such an irritation and convulsive contraction of the muscles of the eye, which chiefly manifests itself from the suddenly starting and pressing forward of the eye, an immediate blood-shot appearance in the vessels of the conjunctiva, an advance of the crystalline lens and iris towards the cornea, &c. An experienced hand will also, in a moment, perceive a stronger and closer pressure against the knife, and combining all these circumstances, the operator is clear of a spasm coming on violently. In this case, when I have my knife in the eye, I push it into the inner corner through the cornea, at least more than a line outward, (vide Tab. IV. Fig. 2) and draw

it in the same direction backward out of the eye, with the certainty of not wounding the iris. However, being so far advanced, it would be easy for me to complete the incision at once; but by drawing back the knife, the aqueous humour flows out: the eye, from that circumstance, becomes collapsed, the muscles not moving with such strength, it begins to be quieter, and comes into that state which is desired. The pupil is now more dilated, and the crystalline lens more forward, but by a gentle rubbing on the closed eye, and applying a handkerchief with cold, or a little warm water (as the circumstance requires), the crystalline lens will soon recede, and set the iris free. This moment must be waited for with patience. When the patient and his eye are at length quiet, I order the upper eyelid to be again kept up, and take that knife, at the point of which is a little round blunted button, (vide Tab. III. Fig. 4.); with this knife I re-enter the opening (vide Tab. IV. Fig. 3.) *a*, and come out through the anterior cham-

ber by *b*, in the inner corner, without the least injury to the iris, and then can (as shews the white points by *c*) finish the incision as large as I desire.

My reasons for using two knives, when I could finish the incision with one, are, that in the first place, I wish the eye to be perfectly quiet, the spasm mitigated, and to prevent the dangerous sudden starting out of the crystalline lens, &c. &c. and secondly, I cannot see of what detriment this second knife can be, as having at the point a little round button, by which it cannot wound or irritate, as it acts only on the insensible cornea. I never knew any great inflammation follow in consequence of this treatment.

Let us now suppose the cornea cut as it should be, and large enough for the passage of the crystalline lens; be not precipitate in drawing out the crystalline lens, but let the eye become again quiet.

The room must, soon after the opening of the cornea, be more darkened, to promote the dilatation of the pupil, and then

try if the crystalline lens, with its capsule, will come out by a soft pressure; (in this instance, the operator himself must keep the upper eyelid up with his finger;) this soft pressure is made by the two underlaid fingers alternately, which occasions the crystalline lens to revolve on its axis, and at length come out of the eye.

But if the operator should perceive that the crystalline lens, with its capsule, will not come near to the pupil, and that the latter is not much enlarged, let him desist in a moment from the attempt, and bring the eye again into a state of rest; for if he should venture to press more strongly, the vitreous humour would protrude first, leaving the Cataract with its capsule behind. This is the worst event which can attend the operation: it sometimes happens also, that by too violent a pressure, the capsule is forcibly rent, at the moment the Cataract comes forward.

Eminent oculists have observed, and my own experience has confirmed it, that if the capsule be forcibly rent in the ope-

ration, the greater part of it becomes thereby afterward opaque, and there remains either a weak sight, or very often a second blindness (*Caracta secundaria*). But, on the contrary, if the capsule be well opened, and cut with a sharp instrument, if a strong inflammation should not occur, the capsule commonly remains clear and transparent.

But to return to the operation ; if the eye is again quiet, then let the upper eyelid be kept up by the assistant with the elevator, and let the operator proceed to open the capsule.

The opening in the capsule must be made as large as possible ; it sometimes happens, that the crystalline lens, while it comes through the capsule, leaves behind an opaque slime, or a broken piece, which must be carefully extracted. This sometimes is not done without much difficulty ; but it seldom happens, if the capsule is sufficiently opened. But if the incision in the capsule is not large enough, it is in vain to at-

tempt the taking out of the opaque part remaining.

A second reason for largely opening the capsule is, that if, for any particular reason, the opaque remainder cannot be extracted, you have the hope, founded upon repeated experience, that the aqueous humour, whilst it flows in the capsule, will dissolve the opaque body. This will be more certain in proportion to the size of the opening. Some oculists open the cornea and the capsule at the same time ; but in this mode, the opening in the latter never can be large enough. Some open it with the cystotom of Lafaye, &c. &c. but I make use of a double-edged needle, (Tab. III. Fig. 5.) of a lancet form, in the following manner ; by the operation of the left eye (make the flap *d* of the chair fall over behind, and let the head of the patient lean a little back ; if the operator has before been seated, he must now stand, to have free motion in finishing the other part of the operation). With my right hand I take the spoon of Daviel, and

with it, keep up the wound in the cornea. I take in the left hand this needle, and keep the under eyelid down with the little finger of the same hand ; I then pass this needle through the wound in the cornea into the pupil, and open the capsule as much as possible, and try to cut it in two half circles, that a whole piece may be taken out from the centre. To cut a large piece out of the capsule, a great degree of dexterity is necessary to the dilatation of the pupil ; namely, to press with the underlaid little finger, softly, the globe of the eye, whereby the crystalline lens, with its capsule, comes nearer to the pupil, which dilates ; but this, as I have said, requires great caution, as the capsule is easily torn by this pressure, and by the touch of the needle, the Cataract will be found suddenly to come out, which must be avoided. If the capsule be cut as well as it is required, the Cataract now, by the soft pressure of the underlaid fingers, turns about its axis, and falls out of the wound in the cornea. It is to be observed, that the

lower edge of the crystalline lens turns forward and upward, and comes into the pupil, before it presses or distends the lower part of the iris outward in any considerable degree, then presses it so forward and downward, that it may be out at the wound in the cornea, till at last the lower edge, and the posterior part of the crystalline lens slips down over the lower edge of the pupil, and out at the wound of the cornea. If the operator takes care after this extraction to keep the eye in a horizontal situation, this slow dilatation of the pupil is of no detriment, the pupil will be perfectly round, and come into its former place.

In case the Cataract is wholly come out of the eye, more light should be admitted into the room, to observe if the pupil be quite clear.—The operator must be very cautious, and keep his hand over the operated eye, and let just as much light fall on it as he finds by his examination to be necessary. He should observe most accurately if any part of the Cataract, or of the

humor Morgagnii, or of the capsule, remains behind opaque ; if any should be found, he must endeavour to bring the first out with the spoon of Daviel, and the latter with a pair of small nippers, or the hook (Tab. III. Fig. 6.). Those opaque particles often remain in the eye undiscovered by the strictest examination, and make their appearance after the wound in the cornea is closed. They are concealed during the operation in the upper part of the capsule, because the pupil is frequently drawn down after the operation : it is therefore the more necessary to examine the pupil by different degrees of light, that if any thing opaque remains behind, it may be discovered.—In this examination the greatest caution is requisite, on account of the irritation occasioned by the entrance of the light into the tender eye. If the pupil be quite clear and black, and no portion of the iris fallen within the wound of the cornea, instantly close the eye, and by no means try to make any experiment, whether the

patient can or cannot see. He can seldom see distinctly, on account of the extracted crystalline lens, the flowing out of the aqueous humour, which renders the cornea wrinkled and flabby. But at all events, it is a vain glorious essay, which is dangerous for the patient's tender eye, which being accustomed to darkness, is irritated by the light. This curiosity seldom goes unpunished.

ACCIDENTS BY THIS OPERATION.

In this operation accidents may occur, the principal of these are, an escape of the vitreous humour, or sometimes a protrusion of the iris, or both, may happen. On these I shall say a few words.

If this humour comes forward before the Cataract, it is for the most part, assignable to some fault of the operator. As soon as the vitreous humour appears, either with or after the coming out of the Cataract, the head of the patient should instantly be placed in a horizontal position, and the

eye immediately closed. I know that the vitreous humour is propelled, not only by its specific gravity, but is pressed out by a spasm in the muscles of the eye; but in either case, I believe this horizontal situation to be the best that can be adopted. When the eye is closed, the rest should be left entirely to nature. Every effort to cut away with scissors, or to return the part of the vitreous humour that hangs out of the cornea, is not only unnecessary, but certainly injurious, as in all these practices light is required, which occasions an irritation of the tender eye, and increases the contraction of the muscles which press on the globe of the eye, and of course tends to promote the flowing out of the vitreous humour.

I have often had occasion to observe, that if a part of the vitreous humour comes out of the wound, it is not always injurious in the event; on the contrary, some patients have again received their sight in a greater degree. It is supposed, in such cases, that the vitreous humour fills up the va-

cancy where the crystalline had before been placed, and this with more advantage to the sight, than the thin aqueous humour which would be otherwise in that place. But notwithstanding this apparent advantage, I always endeavour as much as I can, to prevent the flowing out of the vitreous humour. It has been observed, that the inflammation is always much greater with those patients who have lost a part of this humour, than commonly happens to those who have suffered no such accident; and it likewise mostly leaves behind a deformed and an imperfect pupil too near to the cicatrix. This does not always impair the sight, but depends on the greater or less thickness of the cicatrix (vide Tab. IV. Fig. 4.). It often happens by the flowing out of this humour, that a secondary Cataract arises, however completely the whole crystalline lens, with its capsule, are come out of the eye. The cause of this secondary Cataract is the torn, and after obscured tunica hyaloidea, which I have observed in several places.

If the Cataract is suddenly, or heedlessly pressed out of the eye, it seldom occurs at the same time, but in general soon after the operation, that the iris falls into the wound of the cornea. This appears also after the operation, if the patient presses himself on the eye, as well as if the operation was inaccurately performed.

This protrusion of the iris occasions pain for ever, which is sometimes vehement, and principally increases with the motions of the eye ; the fallen part of the iris rubbing continually on the eyelid. The operator should therefore endeavour, with all possible care, to detect this prolapsus of the iris soon after the operation. Much depends on this circumstance, that the iris be put back immediately, before it is inflamed and swollen, and before it adheres to the cornea, or becomes obdurate.

If the eye, after it is covered, should prove very unquiet and the patient feel a pricking pain on the least motion of the organ ; if the eye which has not shed many tears after the operation, at once begins to run much,

then you have reason to suppose such protrusion of the iris, especially if something has happened in the operation to give occasion to this accident. The operator has then just grounds, with sufficient precaution, to open that eye: if his fear should be confirmed, his first effort should be to bring back again that protruded part of the iris; this can be done without difficulty, if it is recent, and the wound in the cornea large and open; with the spoon of Daviel, and by soft pressure and rubbing, the iris will be restored to its situation again. In this case, let the patient lie a few days in bed, with his head in an horizontal position, and do not make the least pressure upon the eye; now and then let a strong light fall through the eyelid on the eye; because by this means the eye is irritated, and the pupil contracted.—It is not my aim to speak at present on more complicated cases; on a future occasion, I shall probably enter on those parts of the subject not comprised in the present treatise.

THE TREATMENT OF THE PATIENT AFTER
THE OPERATION.

When the operation is finished, make the room almost quite dark, untie the handkerchief from the sound eye, and take two pledgets, about three inches long, and two broad, of long linen (with the threads one way pulled out), wetted with cold water, and lay them cold and wetted on both eyes; then fasten the bandage (Tab. II. Fig. 3.) with the strings on the forehead; now bring the patient, with slow steps, supported by the assistants, and with his head in a horizontal position, to his bed, which in cold or damp weather must be first warmed. With a patient who is plethoric, and has a short neck, you should observe not to suffer him to be with his head too low, because you would drive more blood to his head, which is hurtful; therefore, let him rather sit in an inclined posture, with his head lying rather horizontally.

When he is in bed, let him be released from all unnecessary clothing, and give him a cup of warm tea, to restore the perspiration, which was suppressed through fear; but let it be given him with a spout, or a tea-pot, without raising or moving the head.

I know that some surgeons reject all bandages after the operation; and they are in the right, if the meaning of such bandages is to bind or tie up the eye with a compress, from twelve to twenty-four hours, or for some days. Every practitioner has his own particularities, not founded on caprice, but which his own experience has proved to him to be the best.

The principal reason why I mostly use the cold and wetted pledgets from twenty-four to forty-eight hours is, that the coldness contracts the vessels, and diminishes the impetus of the blood. The ungovernable motion of the eye with the eyelids, after the operation, is also diminished by laying any thing on the eyelids, without making a strong pressure; for this purpose

I find the pledgets to be the best: they should be made of linen, the threads being one way pulled out, and not scraped lint; the former not being so raw and ragged, of course clings less to the eyelashes: it also lies better and more even than such a compress of lint. The pledget should not be too small, because it will cover better, and can be easier taken hold of in applying and taking it away. It should be taken away, and applied from the outside to the inside, because it may otherwise injure the eyelashes, if they stick together, and if you would take it from below upward, it is liable to be pulled asunder. The eyes being so nearly connected, it is my practice to cover both; after one or two hours, I take off the pledget, which serves the purpose of a thermometer, to discover from its dryness or moisture, the state of the operated eye, by comparing it with that of the sound one.

On account of the heat arising from the incipient inflammation, the pledgets should never be quite dry, as it occasions pain;

therefore, without taking it off, it must be often wetted with a sponge dipped in cold water, from which the patient will find much mitigation of his suffering. I never remember to have had an oedematous swelling of the eyelids, of which those who make use of *dry* bandages complain. I will by no means say, that in all cases, the cold wet bandages is to be advised; on the contrary, the former is to be preferred with irritable and susceptible patients, and such as are inclined to take cold, or subject to catarrhs. To mitigate the disagreeable situation of the patient lying on his back, he should also have every additional aid from pillows, and changing cushions, &c. This restraint is in my opinion indispensably necessary for the first twelve or twenty-four hours; as the extraction of the Cataract, and the flowing out of the aqueous humour, for a short time occasions a vacuum; if, therefore, the patient was to have his head upright, the vitreous humour would press with the iris towards the wound in the cornea, the pupil

would sink downwards, the aqueous humour would flow out, and hinder the healing of the wound in the cornea. But, by this horizontal situation, the vitreous humour has not an external cause to change its place: the iris can move freely, without falling into the wound of the cornea; the pupil comes in the middle, where it has before been; and the operator obtains his purpose completely.

Amongst the necessary precautions, one is, that you be secure of the patient's hands; if you are convinced that when awake and governable, he will not touch his eyes; yet, the least irritation occasions him, if asleep, to rub or press the eye, and through it frustrate the whole operation. You cannot trust to the attendants of the patient, as they often are unable to prevent the quick movement of the hands; therefore, I take a ribbon one yard long, and fasten it at each end to the wrists of the patient; to the middle of this ribbon I knot another, which I fasten to the foot of the

bed, in such a manner that the patient can only reach his mouth with the points of his fingers.

Let the lower part of his body be kept sufficiently warm, as well as his feet ; and the head cool, but not so bare as to expose him to taking cold.

After the operation, there is nothing more to be feared than the inflammation and its consequence. It will be less, if the patient is well prepared ; more, if this is at all neglected. It however, sometimes appears sooner, sometimes later. When the first fever, which commonly comes in the first night (if the eye has suffered much by the operation), is high, it is always expected to be violent. Be not careless with a patient who should be some days without pain, inflammation, or fever ; as sometimes he is without either until the sixth or eighth day, when the inflammation comes on suddenly and vehemently. I have seldom had occasion to complain of any high inflammation after this operation ; and the few cases

which I have experienced, the first period has always passed ; and on the sixth or eighth day, the inflammation has begun at once, with much vehemence ; and always through some fault of the patient.

It is impossible to advise specific rules for these cases, the constitution of the patient, and the degree of injury the eye has suffered during the operation, must indicate to the surgeon what remedies he must use ; if the eye has suffered much during the operation, and a violent inflammation is to be feared, I have always found great benefit from a copious bleeding in the arm, as soon as the patient is in bed, whereby the blood out of a large orifice can run free and quick, but according to the constitution of the patient ; afterwards a cooling opening medicine should be given, and an antiphlogistic diet be observed ; recommend him to be calm, and to prevent, as much as lies with him, any thing which may produce irritation in his eye, or his nervous system. In case the patient has not had every day, after

the medicine, an opening of his bowels, it should be promoted by a clyster. Among the consequences of this operation, there is one bad accident which sometimes occurs, viz. spasm; this happens most frequently with such patients as have been very fretful before, and during the operation, and who are very susceptible and irritable. In such habits, it often happens that during, or soon after the operation, they begin to vomit, or to have cholicky complaints, or restlessness and general irritability of the whole nervous system. Every thing must be tried which can lessen these consequences; as lukewarm pediluvia, emollient clysters, warm fomentations upon the belly, &c. and internal opiates; a warm fucus of flor. cham. rom. &c. often diminishes, or removes these accidents very soon. As long as the patient is in this situation, I should, instead of applying the cold compress upon the eye, use a warm fomentation, viz. from a decoction of flor. sambuci, &c. &c. but the surgeon who undertakes this operation,

must know how such accidents are to be treated.

Some hours after the operation, perhaps eight or ten, sometimes sooner or later, the patient perceives a fulness and a sensible pain in the eye on which the operation has been performed, and this pain is always increasing: this is occasioned by the cohesion of the eyelids, and of the puncta lachrymalia, which hinder the tears from running out, and consequently occasion a pain and pressure on the eye. The surgeon should take care in this instance, that the patient may not be in any needless fear. This evil is in a moment cured, if he makes with his finger, in the inner corner of the eye upon the puncta lachrymalia, a gentle and cautious rubbing, in a moment the tears will run out, and the patient will receive great mitigation of his anguish.

The wound in the cornea unites in twelve or twenty-four hours. If the patient be without pain, and no accident has occurred,

so that nothing bad may be presumed, do not open the eye before the fourth or sixth day. In most cases you will find, that if you open it sooner, it will begin to be painful, if it was even before without pain. The eye always suffers in the first opening, from the irritation of the light and air, and the cicatrix is tender; so that by the least inattention, or through this irritation, a spasm is produced in the muscles of the eye, which make a pressure on the globe, the cornea is opened again, and the iris falls into the wound, &c. In a case of such importance to the patient, and where his happiness is depending, he should be cautioned against all haste and premature curiosity.

I know there are some oculists who advise that the eye should be open and cleared every day, immediately after the operation; because, they say, the cornea is soon closed, &c. That may be a fact, and I myself have had patients, where I was obliged to open the eye some hours, or a day after the operation, and found the cornea quite closed;

but with so slight a degree of cohesion, that the smallest pressure, or the least spasm in the eye, opens it again. It is evident therefore, that to open the eye so soon always exposes the patient to danger.

Every expert oculist knows, and has observed, that generally on the third or fifth day after the operation, the patient feels more pain, and even if the eye has been nearly without pain, it is on this day more sensible, and more hot tears gush out; if the eye be not opened, and left quiet, this sensation soon goes away; to open it at that moment, would only cause a needless irritation, and perhaps through it, augment the inflammation.

It is on the contrary, as much against my opinion, to keep the eye too long closed. In general cases, the danger of an inflammation is past the sixth or eighth day; the re-union of the cornea is firm and even, and the eye being rather stronger, is not so much exposed to the danger of an irritation.

The first time the eye is opened, should be in twilight; let the eyelids which cohere be first washed with lukewarm water, and when they are well cleaned, proceed to open the eye. The patient being with his back towards the window, avoid all strong light in the beginning, accustom him to it cautiously and by degrees, and let him make use of a shade, or eye-screen, in the first instance.

In the use of eye-water be very cautious, and if you apply any, let it not be till the decrease of the inflammation, because, if it be used before, it adds to the irritation, and often augments the inflammation; as soon as you permit the patient to keep his eye open, let him sometimes in the day wash it with a little brandy, in four or six times as much cold water. If the vessels of the conjunctiva are still relaxed and full, or the cicatrix of the cornea not even, use sometime a solution of a few grains of white vitriol, in two ounces of distilled water, or a drop of the tinctura thebaic. &c. but the ap-

pearance, must direct the operator what in such cases is to be done.

The more simple the treatment of the patient the better, and as soon as the eye is strong enough to bear a middling glare of light, assist him with convex-ground spectacles ; recommend caution, and then commit him to his own attention, care, and conduct.

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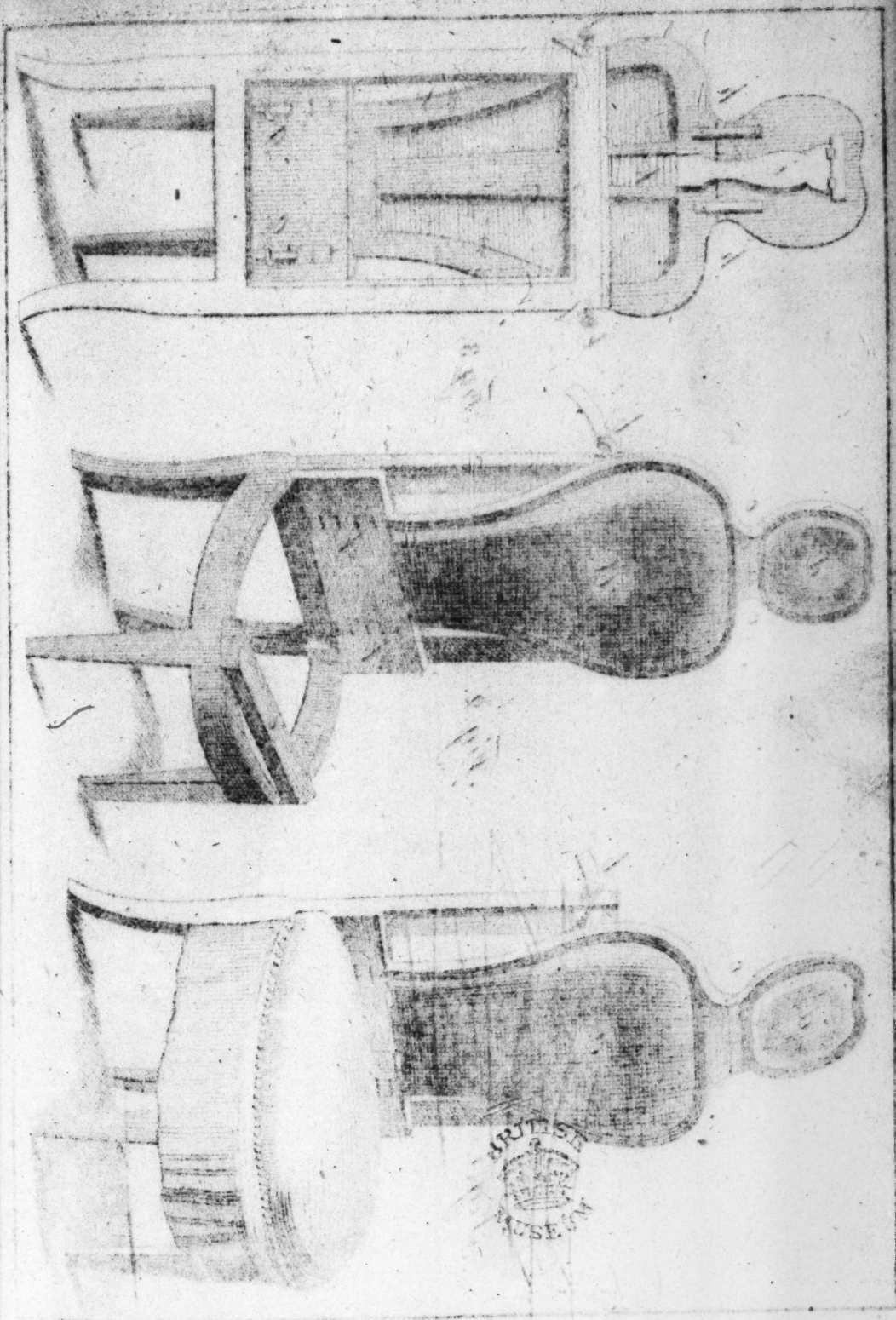
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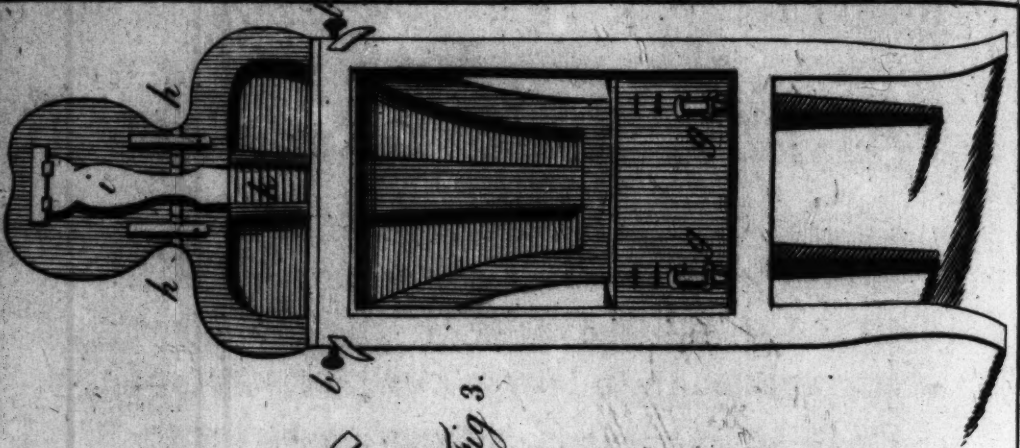
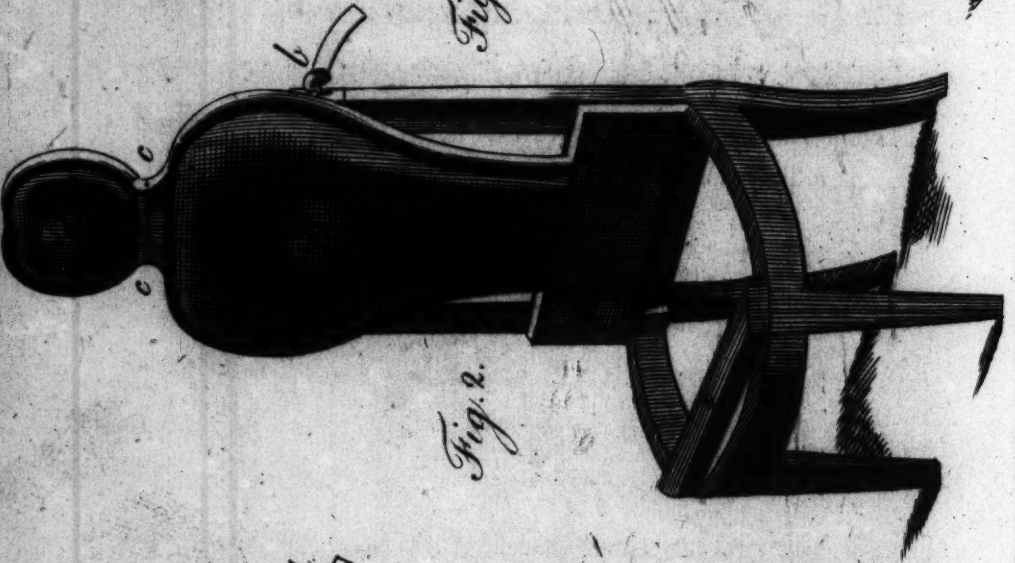
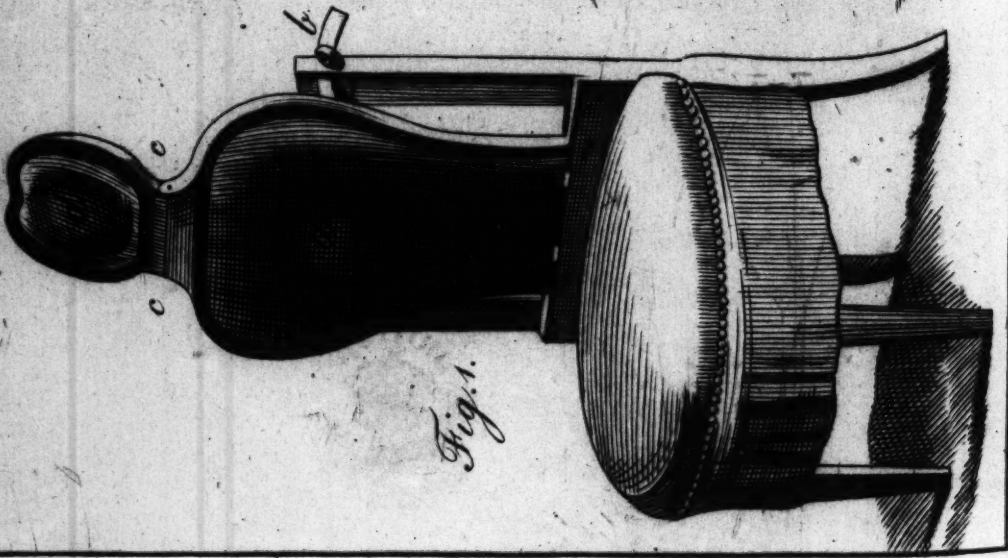
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F. H. Russell, Editor.





Fig. 2.

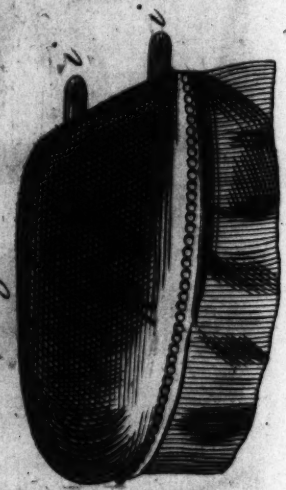


Fig. 1.

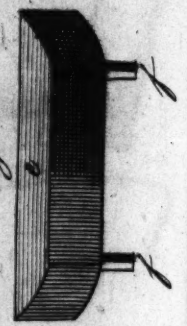
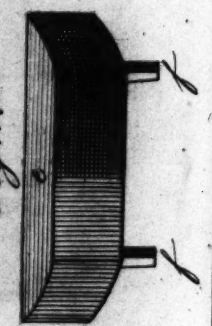


Fig. 1.



The EXPLANATION of the PLATES.

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Tab. I. Fig. 1, 2, & 3, is a chair for the patient during the operation, described	15
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Tab. IV. Fig. 1, is the mode of fixing an unsteady eye with the spear, Tab.

III. Fig. 2.

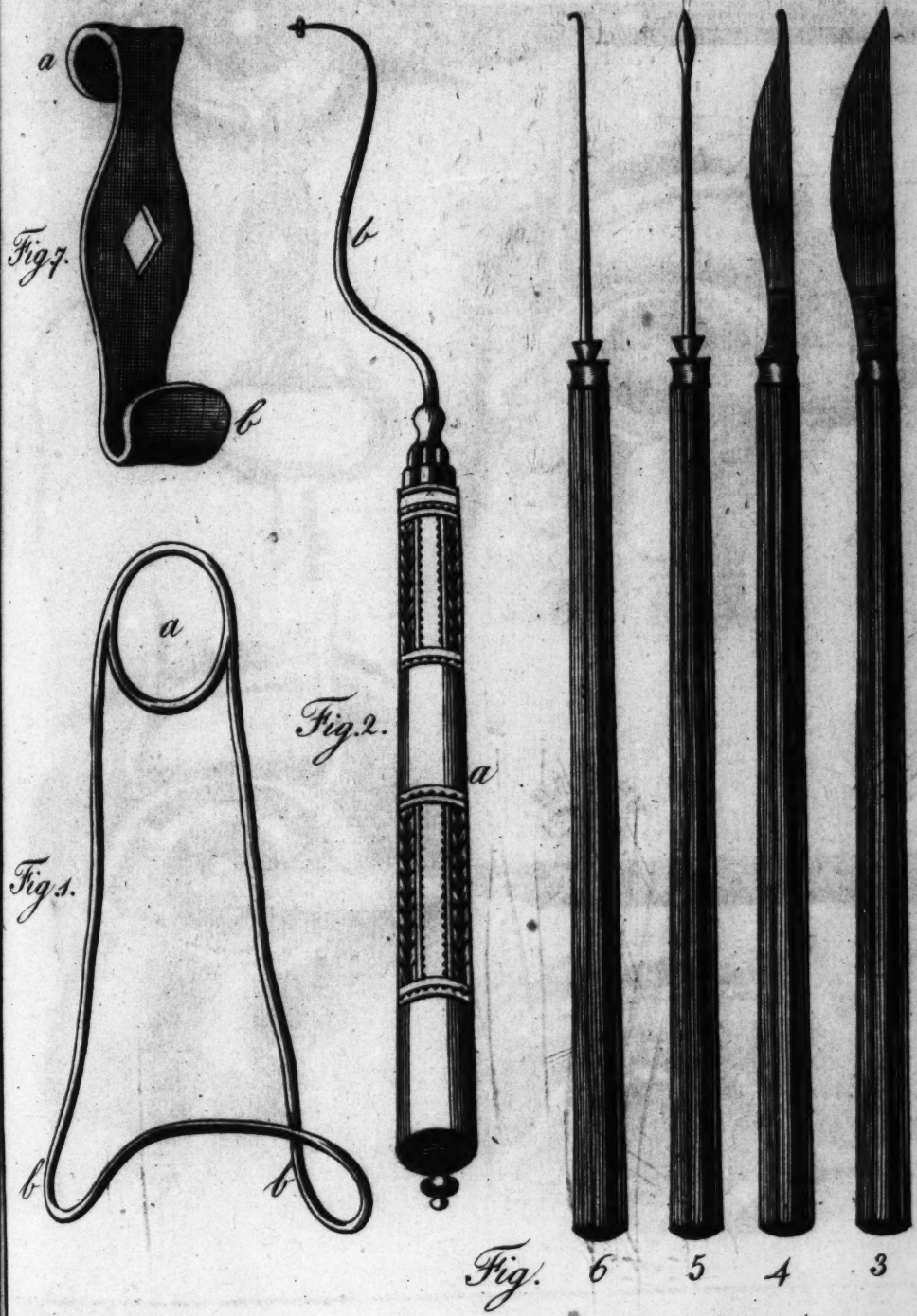
———— Fig. 2, is the manner of making the incision in the cornea

———— Fig. 3, is to shew the use of the knife with the button

———— Fig. 4, is a deformed pupil too near the cicatrix, the common consequence of a sudden protrusion of the Cataract.



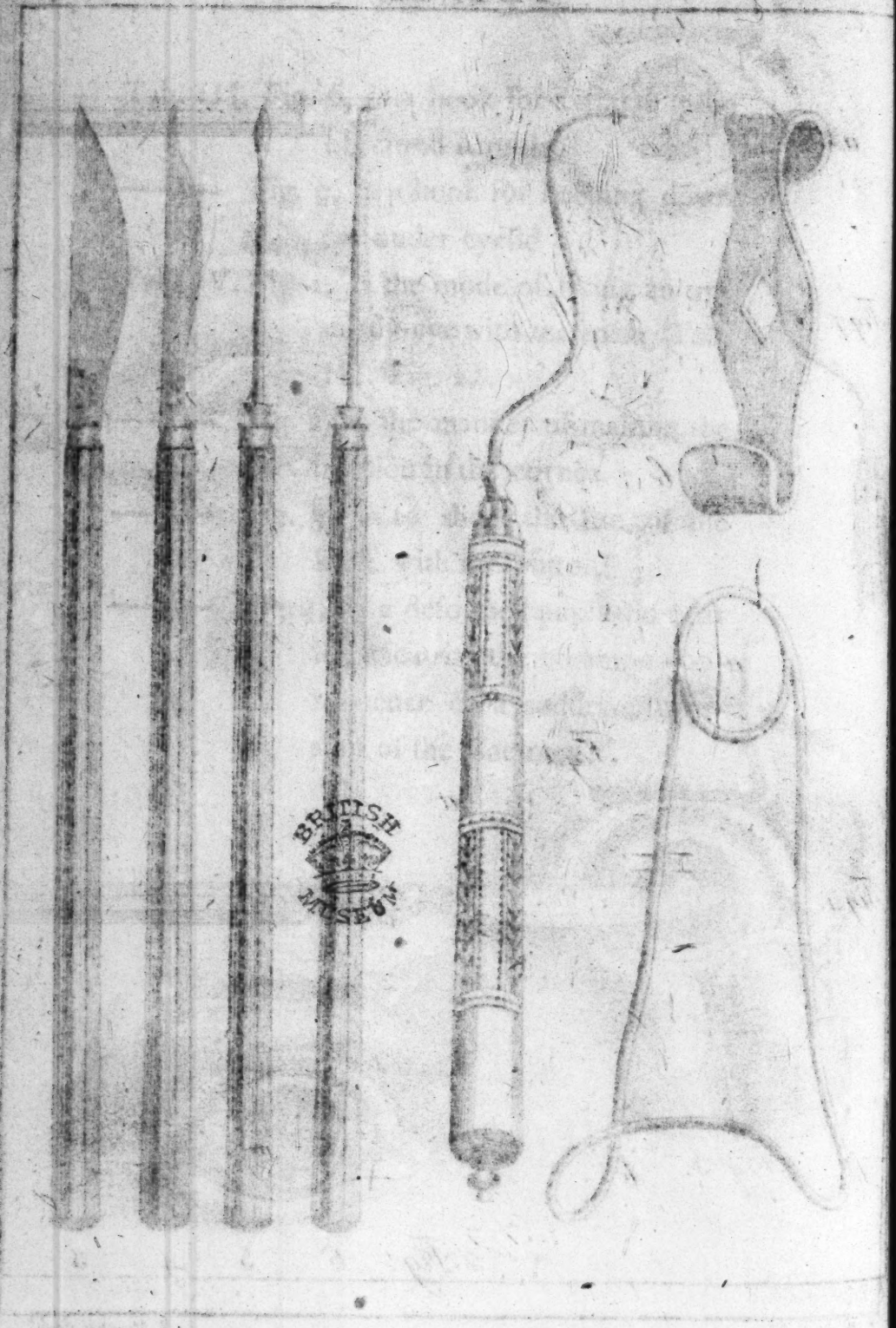
TAB. III.



F. Buschoff delin.

T. Merrifield Sculp.

TAB. III.



T A B. IV.

Fig. 1.

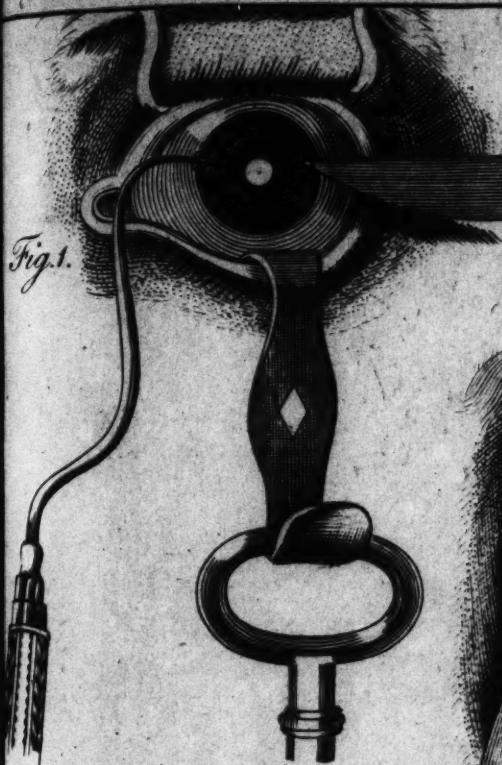


Fig. 2.

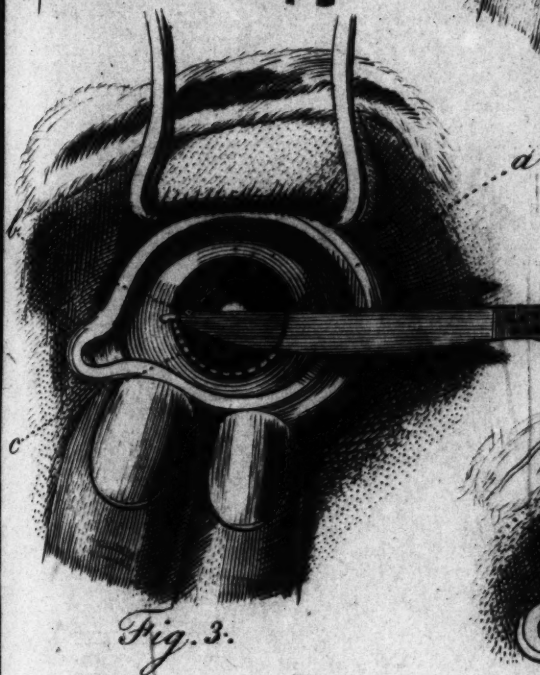
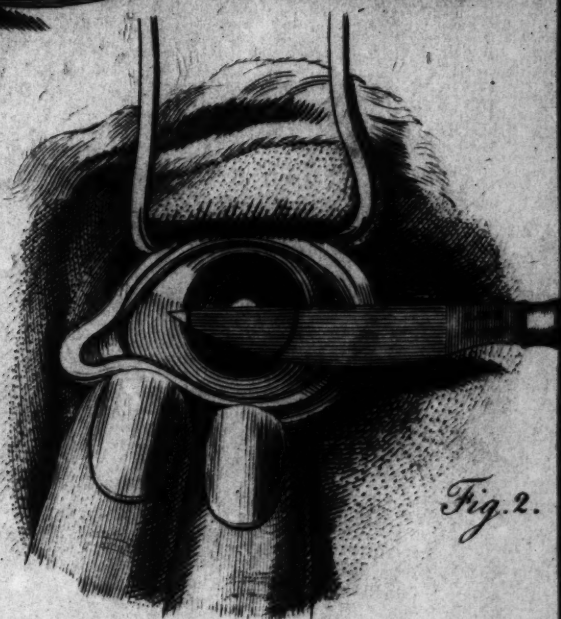


Fig. 3.

Fig. 4.



